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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/577,932	05/25/2000	Shigeyuki Maruyama	000663	4823

38834 7590 10/18/2004

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EXAMINER	
CHU, CHRIS C	

ART UNIT	PAPER NUMBER
2815	

DATE MAILED: 10/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/577,932	Applicant(s) MARUYAMA ET AL.	
	Examiner Chris C. Chu	Art Unit 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 August 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 – 5, 14 and 15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 2, 4, 5, 14 and 15* is/are rejected.

7)☒ Claim(s) *3* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/16/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed on August 05, 2004 has been received and entered in the case.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 2, 4, 5, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beddingfield '502 in view of Matsuda et al. '078.

Regarding claim 1, Beddingfield discloses in Figs. 2 – 7 a semiconductor device comprising:

- a semiconductor element (100 and 32) having a plurality of electrodes (102 in Fig. 7 and 39 in Fig. 2);
- a plurality of metal posts (108 and 72) each with a first shape and a first size formed on the electrode pads (104) of a redistribution layer (103), the metal posts being configured to be provided with external connection electrodes (41); and

- at least one mark member (110 and 74) with a second shape and a second size which serves as an alignment mark located in a predetermined positional relationship with the metal posts,
- wherein the mark member is made of the same material as the metal posts; and
- wherein the first shape and the first size are correspondingly different from the second shape and the second size; and
- wherein the metal posts have a flat top surface (see Fig. 7 and column 7, lines 3 – 6).

Beddingfield does not disclose a redistribution layer having a plurality of electrode pads and electrical conductive patterns connecting the electrodes of the semiconductor element to the respective electrode pads. However, Matsuda et al. discloses in Fig. 1 and column 4, lines 46 ~ 52 a redistribution layer (25) having a plurality of electrode pads (31) and electrical conductive patterns (29) connecting electrodes (22) of the semiconductor element (21) to the respective electrode pads. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Beddingfield by using the redistribution layer as taught by Matsuda et al. The ordinary artisan would have been motivated to modify Beddingfield in the manner described above for at least the purpose of decreasing noises (column 1, lines 48 ~ 61).

Regarding claim 2, Beddingfield discloses in Fig. 7 the alignment mark having an outer configuration other than a circle (e.g., 74).

Regarding claim 4, Beddingfield discloses in Figs. 2 – 7 a semiconductor device comprising:

- a semiconductor element (100) having a plurality of electrodes (102);

- a redistribution layer (103) including a plurality of electrode pads (108 and 72) each with a first shape and a first size located in predetermined positions of the redistribution layer; and
- at least one mark member (110 and 74) with a second shape and a second size which serves as an alignment mark located in a predetermined positional relationship with the electrode pads,
- wherein the mark member is made of the same material with the electrode pads; and
- wherein the first shape and the first size are correspondingly different from the second shape and the second size;
- wherein the plurality of electrode pads have a flat top surface (see Fig. 7 and column 7, lines 3 – 6).

Beddingfield does not disclose a plurality of conductive patterns in the redistribution layer that connects the electrodes of the semiconductor device to a plurality of electrode pads. However, Matsuda et al. discloses in Fig. 1 and column 4, lines 46 ~ 52 a plurality of conductive patterns (29) in a redistribution layer (25) that connects electrodes of a semiconductor device (21) to a plurality of electrode pads (31) of the redistribution layer. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Beddingfield by using the plurality of conductive patterns into the redistribution layer as taught by Matsuda et al. The ordinary artisan would have been motivated to modify Beddingfield in the manner described above for at least the purpose of decreasing noises (column 1, lines 48 ~ 61).

Regarding claim 5, Beddingfield discloses in Figs. 2 – 7 the alignment mark having an outer configuration other than a circle.

Regarding claim 14, Beddingfield discloses in Figs. 2 – 7 a semiconductor device comprising:

- a semiconductor element (100 and 32) having a plurality of electrodes (102 in Fig. 7 and 39 in Fig. 2);
- a plurality of metal posts (108 and 72) with a first shape and a first size formed on the electrode pads (104) of the redistribution layer (103), the metal posts being configured to be provided with external connection electrodes (41); and
- at least one mark member (110 and 74) with a second shape and a second size which serves as an alignment mark located in a predetermined positional relationship with the metal posts;
- wherein the first shape and the first size are correspondingly different from the second shape and the second size;
- wherein the metal posts have a flat top surface (see Fig. 7 and column 7, lines 3 – 6).

Beddingfield does not disclose a redistribution layer having a plurality of electrode pads and electrical conductive patterns connecting the electrodes of the semiconductor element to the respective electrode pads. However, Matsuda et al. discloses in Fig. 1 and column 4, lines 46 ~ 52 a redistribution layer (25) having a plurality of electrode pads (31) and electrical conductive patterns (29) connecting electrodes (22) of the semiconductor element (21) to the respective electrode pads. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Beddingfield by using the redistribution layer as taught by Matsuda et al. The ordinary artisan would have been motivated to modify Beddingfield in the manner described above for at least the purpose of decreasing noises (column 1, lines 48 ~ 61).

Regarding claim 15, Beddingfield discloses in Figs. 2 – 7 a semiconductor device comprising:

- a semiconductor element (100 and 32) having a plurality of electrodes (102 in Fig. 7 and 39 in Fig. 2);
- a plurality of metal posts (36, 108 and 72) formed on the electrode pads (104) of the redistribution layer (103); and
- at least one mark member (110 and 74) which serves as an alignment mark located in a predetermined positional relationship with the electrode part, the mark member comprising one of the metal posts but lacking the protruding electrode; and
- wherein the metal posts have a flat top surface (see Fig. 7 and column 7, lines 3 – 6).

Beddingfield does not disclose a redistribution layer having a plurality of electrode pads and electrical conductive patterns connecting the electrodes of the semiconductor element to the respective electrode pads. However, Matsuda et al. discloses in Fig. 1 and column 4, lines 46 ~ 52 a redistribution layer (25) having a plurality of electrode pads (31) and electrical conductive patterns (29) connecting electrodes (22) of the semiconductor element (21) to the respective electrode pads. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Beddingfield by using the redistribution layer as taught by Matsuda et al. The ordinary artisan would have been motivated to modify Beddingfield in the manner described above for at least the purpose of decreasing noises (column 1, lines 48 ~ 61).

Allowable Subject Matter

4. Claim 13 is allowed (see Office action mailed on November 5, 2003 for the examiner's statement of reasons for allowance).

5. Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 3 contains allowable subject matter because none of references of record teach or suggest, either singularly or in combination, at least the limitation of a width of the alignment mark measured along a plane parallel to a surface of the redistribution layer being greater than a height of the metal posts.

Response to Arguments

6. Applicant's arguments filed on August 5, 2004 have been fully considered but they are not persuasive.

On page 8, lines 2 – 5, applicant argues "each of claims 1, 14 and 15 recite the feature 'wherein the plurality of metal posts have a flat top surface.' Claim 4 recites 'wherein the plurality of electrode pads have a flat top surface.' These features recited in claims 1, 4, 14 and 15 are not disclosed or suggested by the cited prior art." This argument is not persuasive. Beddingfield clearly shows in Fig. 7 the plurality of metal posts (108) and the plurality of electrode pads (104) have a flat top surface. Furthermore, the phrase "being configured to be provided with external connection electrodes" is functional language which is not deemed to

carry any patentable weight since: (i) the function does not differentiate the claimed apparatus over Beddingfield and Matsuda et al.; and (ii) the plurality of metal posts disclosed is conceivably able to allow to connect with external connection electrodes.

For the above reasons, the rejection is maintained.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is 571-272-1724. The examiner can normally be reached on 10:30 - 8:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 517-272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chris C. Chu
Examiner
Art Unit 2815

c.c.
10/15/04 4:00:00 PM

GEORGE ECKERT
PRIMARY EXAMINER